

the transverse crests strong; the median crest distinct on the last; *sterna* finely granular, the last with the four crests distinct and granular, and two crests on the fourth sternite.

*Tail* relatively weak and slender, posteriorly narrowed, the first segment distinctly wider than the fourth, which is about twice as long as wide; all the intercarinal spaces, including the superior, finely granular; all the keels pronounced and granular, but none of the superior keels in any sense denticulate, evenly granular throughout; vesicle granular, distinctly narrower than hand, about equal to the brachium.

*Chelæ* sculptured as in the other species, except that the anterior surface of the humerus and brachium are evenly granular throughout (except for the presence of one basal denticle on the brachium), instead of being irregularly denticulate; hand with strong finely granular keels; the outer finger-keel also strong and almost complete, merely interrupted for a short space; the finger and hand exceeding in length the first two tail-segments and half the third, the movable digit twice the length of the hand-back, not lobate, nor is the immovable basally sinuate; 18 median rows of teeth on the digit, and the same number composing the outer and inner series.

Pectinal teeth 20; shaft not basally lobate.

*Measurements in millimetres.*—Total length 61; length of carapace 7, of tail 39, width of its first segment 3·5, of its fourth 3·1, of vesicle 2·8, of brachium 2·8, of hand 3·1; length of brachium 8·5, of hand-back 5, of movable digit 10.

*Loc.* Brazil (*E. Doubleday*).

Differing from the species allied to *forcipula* &c. in having no expansion of the base of the pecten, in having the upper caudal keels evenly granular, and the anterior surface of the humerus and brachium without irregular denticulations; tail narrower, &c. From *T. stigmurus* (Thorell), which it resembles in many characters, it may be distinguished by its uniform dark colouring.

---

LIV.—On *Sus verrucosus*, Müll. & Schleg., and Allies, from the Eastern Archipelago. By Dr. C. I. FORSYTH MAJOR.

ONE of the most striking and important characters of *Sus verrucosus* from Java, and its allies from Borneo, Celebes, the Philippines, &c., as well as of *Sus barbatus*, Müll. & Schleg., is to be found in the shape of the lower canines.

*Ann. & Mag. N. Hist.* Ser. 6. Vol. xix. 37

This was first pointed out by Nathusius\* with regard to *S. verrucosus* proper, from Java. He stated that in *Sus* the transverse section of the lower canine forms a triangle; but whilst in *Sus scrofa* the posterior side is, next to the anterior one, the broadest, and the outer side only half as broad as the first named, in *Sus verrucosus* the outer side has almost double the breadth of the posterior one. A similar statement was made by Rüttimeyer †, who, in his last paper on the subject ‡, figures transverse sections of the lower canines of *Sus verrucosus*, *vittatus*, and *scrofa*.

The character alluded to, as well as the other distinctive characters of *S. verrucosus*, escaped the notice of J. E. Gray, when, in 1873 §, he figured and described three skulls belonging to the *verrucosus*-type, classing them into three distinct genera: the *Sus verrucosus* of Java, and "*S. celebensis*, Müll. & Schleg.," of Celebes, are called *Dasychaerus*; a variety of the same from Amboina (Moluccas) is mistaken for a *S. vittatus*, and figured and described as the type of "*Aulacochoerus vittatus*"; whilst an immature skull of the *Sus verrucosus* from Java is introduced as a new species of *Sus*, *S. mystaceus* ||; and an immature skull of the Celebes variety of *S. verrucosus*, from Macassar, is called *Sus timorensis*.

The Wild Hog from Ceram was rightly considered by Gray, in 1868 ¶, to be a variety of *S. verrucosus*; in the Hand-list (1873) the "var. *ceramicus*" is cancelled again, the Ceram Wild Hog figuring simply as *Sus verrucosus*.

In a communication made to the Pisa Society of Natural History, and of which only the conclusions were published in a very general manner\*\* , I stated briefly that the *Sus Strozzi*,

\* H. v. Nathusius, 'Vorstudien für Geschichte und Zucht d. Haustiere zunächst am Schweineschädel.—Anhang. Der Schädel von *Sus verrucosus*, Müll. und Schleg.,' Berlin, 1864, p. 181.

† L. Rüttimeyer, "Neue Beiträge zur Kenntniss der Torfschweins.—Anhang. Ueber *Sus verrucosus*, Müll. und Schleg." (Verh. naturf. Ges. Basel, iv. 1, 1865, p. 184).

‡ L. Rüttimeyer, "Einige weitere Beiträge über das zahme Schwein und das Hausrind" (Verh. naturf. Ges. Basel, vi. 1878, p. 463, pl. facing p. 495, fig. 7).

§ J. E. Gray, 'Hand-list of the Edentate, Thick-skinned, and Ruminant Mammals in the British Museum,' London, 1873, pp. 58-60, 62, pl. xxiv. figs. 1-3, pl. xxvi.

|| See the correct reference of this name to *S. verrucosus* by O. Thomas, as quoted by Nehring, with his own remarks on the same in "Ueber die javanischen Wildschwein-Arten," etc. (Zool. Garten, xxxvi. 1895, p. 45).

¶ P. Z. S. 1868, p. 24, and Cat. Carniv. &c. (1869) p. 330.

\*\* Forsyth-Major, "Studii sugli avanzi pliocenici del genere *Sus* (*Sus Strozzi*, Menegh.)" (Atti Soc. Tosc. Sc. Nat. Pisa, vol. ii. 13 marzo, 1881, p. 227)

Men., of the Upper Pliocene of the Val d'Arno, bears more relation to the species of *Sus* of the Indian Archipelago, and, above all, to *Sus verrucosus* of Java, than to *Sus scrofa*. The characters of the skull of the young *S. scrofa* are permanent in *S. Strozzi*, as well as in the Indian members of *Sus* generally, and more particularly in *S. verrucosus*; one of the characters referred to\* is in the shape of the lower canines.

This statement requires some further explanation. In some Middle Tertiary members of *Sus* no difference is to be found between the two sexes in the size or shape of the tusks; both have their lower canines of moderate size and width, the outer and inner side being of equal breadth. This condition is more or less maintained permanently by the females of Pliocene and recent members of the genus, whereas in some Pliocene forms of *Sus* the male sex acquires much larger inferior canines, in which, however, the relative proportions of size of the three sides, as seen in the females, as well as in both sexes of forms more ancient than these Pliocene ones, are still preserved. Gradually, however, these relative proportions become altered, till at last we come to have the male *S. scrofa*-type of lower canines, as described by Nathusius; but, as a matter of fact, even in this modernized type the canine of young males shows the original conformation.

The Pliocene forms of *Sus*, which have the above characters, are, as I long ago † pointed out: "*Sus giganteus*," Falc. & Cautl., from the Pliocene of the Siwaliks ‡, and *S. Strozzi*, from the Upper Pliocene of Italy (Val d'Arno, Olivola, &c.); and I then mentioned that not only *S. verrucosus* resembles these fossil forms in this as well as in other respects, but that *S. barbatus* shows the same conformation of lower canines §.

Nehring has dealt with the same argument, so far as recent Suidæ are concerned, particularly in two of his numerous important papers on the group ||; and recently Heude enters into minute particulars as to the enamel-sculpture and shape of the lower canines of *Sus*, to illustrate which are devoted

\* See also Forsyth Major in Atti Soc. Tosc. Sc. Nat. vii. 1890, p. 61.

† "Studien zur Geschichte der Wildschweine" (Zool. Anzeiger, 1883, p. 299).

‡ I had in view the fig. 17, pl. 71, of the 'Fauna Antiqua Sivalensis.'

§ See also Forsyth Major, "L'Ossario di Olivola in Val di Magra (Prov. di Massa-Carrara)" (Atti Soc. Tosc. Sc. Nat., Proc. Verb. vii. 1890, p. 61).

|| Sitzungsber. Ges. naturf. Freunde zu Berlin, 21 Febr. 1888, p. 9.

A. Nehring, "Ueber *Sus celebensis* und Verwandte" (Abhandl. und Berichte d. k. Zool. und Anthropol.-Ethnogr. Museums zu Dresden, 1880-89, no. 2: Berlin, 1889, p. 11).

three quarto plates, twenty-four different types being figured\*. The various forms of *Sus* of the Indian Archipelago are comprised under the denomination of *Nesosus*, and the remarkable fact is brought to notice that on the continent, in Cochinchina, occurs an unmistakable member of the *verrucosus* type.

It might be a matter of discussion whether a new generic term was needed (if so, Gray's *Dasychærus* would have the priority); but at any rate its eventual utility is neutralized by deliberately including in it the *S. vittatus* †.

Heude apparently is acquainted with the Siwalik *Suidæ* only by what is reproduced of them on pl. ix. (*Sus*) of Blainville's 'Ostéographie'; this might explain how he comes to state that "on sait que les origines des terrains tertiaires sous-himalayens ne nous reportent pas au *Nesosus*" ‡. It may be seen, from what I have said above, that the contrary is true.

### 1. *Sus verrucosus mindanensis*, subsp. n.

Alluding to my paper in the 'Zool. Anzeiger' §, Nehring || declares that he cannot completely approve of the somewhat radical manner of my reducing all the living species of *Sus* to three or four, viz. *S. barbatus*, *S. verrucosus*, *S. vittatus*, *S. scrofa*.

My proceeding might perhaps more appropriately be termed conservative, whilst I would call radical the introducing of about 35 new species of *Sus* by Père Heude. Apart from this, from what Nehring formerly stated on the same sub-

\* P.-M. Heude, S.J., 'Etude sur les Suilliens' (Mém. concernant l'Hist. Nat. de l'Empire Chinois par des Pères de la Compagnie de Jésus, t. ii. 2, Chang-Hai, 1892, p. 87, pl. xxix. A, B, C).

† *L. c.* p. 85.

‡ *L. c.* p. 101.

§ *L. c.* p. 295 sqq.

|| 'Ueber *Sus celebensis* und Verwandte,' p. 27: "Die etwas radicale Art und Weise, in welcher Forsyth Major in seiner . . . Abhandlung, die sämtlichen lebenden *Sus*-Arten auf 3 resp. 4 reducirt, nämlich auf *S. barbatus*, *S. verrucosus*, *S. vittatus*, und eventuell *S. scrofa*, kann ich nicht ganz billigen. Einerseits ist *S. celebensis* nach meiner Ansicht eine 'gute Art,' andererseits finden sich unter den von Forsyth Major zu *S. vittatus* gerechneten Formen mehrere, welche von einander sicher unterschieden werden können" [here reference is made to two of the author's papers, 'Zool. Anz.' 1885, p. 352, and 'Zool. Garten,' 1885, p. 334, in which similar opinions were expressed]; "überhaupt ist die Auseinanderhaltung der einzelnen Local-Rassen resp. Subspecies bei den Wildschweinen von unzweifelhafter Bedeutung für ein tieferes Eindringen in den Process der Artbildung nach Raum und Zeit, was auch Forsyth Major anerkennt."

ject \* it appears that he was partly influenced by the views expressed by Lydekker; but from what he says in the passage quoted, it can be seen that on the whole our views are not so very different. In the present instance we have especially to deal with the question, whether it be more convenient to rank the Celebes Wild Hog as a species distinct from the Javan *S. verrucosus*, or to call it merely a variety of the latter. The former course is followed by Nehring, whilst I advocated the latter. I would see no difficulty in adopting, for convenience' sake, Nehring's mode of naming, if there were no other but the two forms just mentioned †; but there are others, which I am going to discuss; so that my answer to Prof. Nehring is contained in the following pages.

Dampier, in 1686, mentions the Wild Hogs of the Isle of Mindanao (Philippines) in the following words:—"The Hogs are ugly Creatures; they have all great Knobs growing over their Eyes, and there are multitudes of them in the Woods. They are commonly very poor, yet sweet." ‡

In a paper contributed to the Transactions of the Royal Society of London, the Jesuit Missionary Camel enumerates, apart from the domestic pig, three kinds of wild hogs from the Philippines §:—

"No. 25. Ababa. *Aper brevipes*.

"No. 26. *Porci item species pygmæi, feri, cursu velocissimi*.

"No. 27. Bayong s. Pagil. *Aper montanus*.

"No. 28. Babuy. *Sus domestica*."

Two of the above native names are mentioned also by E. v. Martens, who writes as follows respecting the Wild Boars of the Philippines ||: "Wildes Schwein, *javali* der Spanier, *baboy damo* der Tagalen, an anderen Orten *pagil, bayong* etc.

\* A. Nehring, "Ueber eine neue Art von Wildschweinen (*Sus longirostris*, Nehring) aus Südost-Borneo" (Zool. Anzeiger, no. 197, 1885, p. 352). As to Lydekker's opinions, see below.

† I have myself of late (P. Z. S., March 16, 1897) proposed to maintain the Madagascar Wild Hog as a separate species, although it differs not more widely from the *Potamocharus chæropotamus* (Desmoul.) (*P. africanus*, auct., *P. larvatus*, auct.) than does "*Sus celebensis*" from the Javan *S. verrucosus*. But I would have to change my view if there were found in Madagascar other forms of wild hogs, differing less from *P. chæropotamus* than those I am acquainted with.

‡ William Dampier, 'A new Voyage round the World,' vol. i. 7th ed. (In 'A Collection of Voyages in four Volumes.' London, 1729. Vol. i. p. 320: Isle of Mindanao anno 1686.)

§ "De Quadrupedibus Philippensibus Tractat. a Reverendo Georg. Jos. Camel transmissus Jacobo Petiver, Pharmacop. et Societ. Regiæ Soc. Londini" (Philos. Trans. vol. xxv. for the years 1706 and 1707, London, 1708, pp. 2200, 2201).

|| Pr. Exped. nach Ost-Asten, Zool. Theil, i. p. 195.



genannt, überall häufig, von Cagayán, der nördlichsten Provinz Luzons, bis Mindanáó, das Fleisch allgemein geschätzt."

Only during the last few years have we received some more accurate information about these Wild Hogs. In 1888 Huet described and figured a new species from Luzon, *Sus Marchei*\*. The figure of this skull is rather indifferent and not trustworthy, as Nehring has pointed out.

A careful description, with figures, of a wild hog from Luzon (Philippines) is given by Nehring †, under the name *Sus celebensis* var. *philippensis*, Nehring †. In a later paper §, the same author has shown that *S. Marchei*, Huet, is identical with *S. celebensis* var. *philippensis*, Nehr.

The skull of the male *philippensis*, as compared with the male *celebensis*, is characterized as follows by Nehring || :— The skull from the Philippines is lower, more elongate, and has a narrower snout than is generally the case in "*S. celebensis*" from South Celebes. The osseous crest above the alveolus of the upper canine is lower and not so thickened behind as in *celebensis*, more resembling the Javan *verrucosus* in this respect.

So far, these characters apply as well to the skull of an adult male in the British Museum (91.11.28.3) from Ayala, Mindanao, but it carries them farther still and has, besides, characters of its own. In length (basal length 269 millim.) the Mindanao skull slightly exceeds the two male skulls described by Nehring (259 and 252 millim.), whilst all the principal dimensions of height and breadth remain below those of the two skulls from Luzon, absolutely under those of the larger one, and relatively—when reduced, as in the following figures, to percentages of the basal length—under those of the smaller one :—

	M.	L.
Relat. breadth of skull at largest (between zygom. arches).....	48·3	52·5 . 51·2
Relat. frontal breadth at largest (between post-orbital processes of frontal) .....	32·7	34·7 . 33·7
Relat. frontal breadth at narrowest .....	22	23·2 . 22·2
Relat. breadth of occipital squamæ (alæ) ....	26·4	33·2 . 29·4
Relat. breadth of mandibula between the condyles .....	40·8	44 . 42·5
Relat. height of occiput .....	40	45·6 . 40·5
Relat. height of skull (resting on mandibula)..	63·2	73·4 . 68·6

\* 'Le Naturaliste,' Jan. 1888, pp. 5-7. See also Nehring in Sitzungsber. Ges. nat. Fr. 1894, p. 192 footnote, and p. 219.

† "Ueber *Sus celebensis* und Verwandte" (*l. c.* pp. 14-17, 24-26, Taf. i. figs. 3, 4, Taf. ii. fig. 4).

‡ Heude has erroneously attributed this name to Huet (*l. c.* 1892, p. 86, 1894, p. 217).

§ Sitzungsber. Ges. nat. Fr. 1894, p. 220.

|| "Ueber *Sus celebensis* und Verwandte," p. 15.

Peculiar features of the Mindanao skull are to be found in the considerable length of the snout:—

	M.	L.
Relat. length of intermaxilla at alveolar border	26·4	24·7 . 23·8

The nasals of the Mindanao skull are very narrow in the middle of their length; but the whole of the nasal region still remains remarkably broad, on account of the overlapping of the intermaxillæ on the upper surface of the nasal region.

On placing side by side the Mindanao skull with those of the Celebes form and the *verrucosus* proper from Java, there can remain no doubt that the first differs as much from the second as this latter does from the third. So that if the Celebes Wild Boar is to be maintained as a distinct species, it would be only consistent to raise the Mindanao form as well to specific rank. Of course, it results from the foregoing remarks that the Luzon form holds in most respects an intermediate position between *mindanensis* and *celebensis* (contrary to what might have been expected from the geographical position of its habitat). But, on the other hand, the Bornean form of *verrucosus*, to be considered hereafter, intervenes between *celebensis* and *verrucosus* of Java, by the considerable breadth between the zygomatic arches and by the relative shortness of the last molar.

Lastly, to connect all these forms still closer together, almost all the characters by which *philippensis* and *mindanensis* differ from *celebensis* are such as approach the first two to the Javan *verrucosus*.

Under these circumstances I cannot see my way to establishing a new species for the Mindanao form, and still less can I range it as a variety under a species *S. celebensis*. But I prefer to treat it as a subspecies of *S. verrucosus*, Müll. & Schleg., on equal rank with *S. verrucosus celebensis*, *S. verrucosus philippensis*, Nehr., and the other forms with which I have still to deal. *S. verrucosus* of Java becomes the type of the species on no other than priority grounds.

Heude has of late described and figured no less than seven new species of *Sus* from the Philippines: 1. *Sus effrenus*; 2. *S. frenatus*; 3. *S. microtis*; 4. *S. cebifrons*; 5. *S. minutus*; 6. *S. arietinus*; 7. *S. calamianensis* \*. Four of these, viz. 1, 2, 3, 6, are from the Island of Luzon; the first-named three from one locality, Jala-Jala, “une langue de terre de huit kilomètres de côté; elle termine la grande péninsule dépendant de la province de Moron, dans le lac de Bay” †.

\* “Notes sur quelques crânes de Sangliers des Philippines” (*l. c.* ii. 4, 1894, p. 212).

† *L. c.* p. 216.

To judge from the short description of the skulls and dentition and from the figures—unfortunately no measurements are given,—none of these four “species” can be separated from Nehring’s *S. celebensis* var. *philippensis*.

In applying the criteria for specific distinctions resorted to by Père Heude to the crania of the Indian “*Sus cristatus*” in the Natural History Museum, from 12 to 15 different species of Indian Wild Boars might be easily distinguished. We must, however, be grateful to the author for showing us the amount of variability in these forms, even those from the same island.

The skull of “*S. cebifrons*,” from Cebu\*, conveys the impression of being that of a more or less domesticated animal, possibly a cross with a domestic pig—a not unfrequent occurrence in those islands, according to Père Heude’s statement †.

Of “*Sus minutus*” ‡, distinguished by its small size, the very simple structure of its molars §, and the large size and elevation of premolars ||, which characters distinguish it from *mindanensis*, no habitat is given in the description; but I understand, from what is said incidentally ¶, that it occurs in Mindanao—so that there seem to be two forms of wild pigs in Mindanao.

Of “*S. calamianensis*” we shall have to say something later on.

## 2. *Sus verrucosus amboinensis*, subsp. n.

There are two skulls (both males) of the Wild Boar of Amboina (a small island to the south-west of Ceram) in the Natural History Museum, 59.6.4.6 (1362 c) and 59.6.4.5 (1362 d) \*\*; both were collected by A. R. Wallace, and figure in the catalogues under the head of *S. vittatus*. Rolleston was aware that the skull 1362 d is a “*Sus verrucosus*” ††, but, by a strange inadvertance, he mentions on the opposite page

\* Pl. xxviii. figs. 1, 2, 3.

† T. ii. 1894, p. 312.

‡ L. c. p. 218.

§ L. c. pl. xx B. fig. 1.

|| Pl. xvii. figs. 6–8.

¶ L. c. ii. 3. 1894, p. 129.

\*\* Gerrard, ‘Catalogue of the Bones of Mammalia in the Collection of the British Museum,’ 1862, p. 277; J. E. Gray, ‘Synopsis of the Species of Pigs (Suidæ) in the British Museum,’ P. Z. S. 1808, pp. 25, 26; J. E. Gray, ‘Catalogue of Carnivorous, Pachyd., and Edent. Mammalia in the Brit. Mus.,’ 1869, p. 331; J. E. Gray, ‘Hand-list of the Edentate, Thick-skinned, and Ruminant Mammals in the British Museum,’ 1873, p. 58, with figure (profile) of 1362 c, pl. xxiv. fig. 3.

†† Trans. Linn. Soc. (2) i. 1877, p. 271.



the other skull from Amboina as belonging to *S. vittatus* \*. This is the same skull which, as pointed out above, is figured in profile in the 'Hand-list,' with the inscription *Aulacochærus vittatus* †.

Whilst *mindanensis* approaches *philippensis*, the present Amboina form is more closely related to *celebensis*, so as to agree with the last in all the characters in which *philippensis*, according to Nehring ‡, departs from it; the agreement is closer still than between *philippensis* and *mindanensis*.

The skull of *amboinensis*, then, is higher and broader than *philippensis*, and still more so than *mindanensis*. Whilst the basal length of the latter form is equal to that of the Amboina wild pigs (M.=269, A.=270 . 268), the united parietals and frontals are considerably longer in A. (164 . 169, M. 149), whereas the nasals are much shorter (A. 153 . 155, M. 164). Taking *philippensis* into account as well, the percentage lengths stand thus:—

	M.	P.	A.
Parietals and frontals .....	55.4	58.7 . 57.3	60.74 . 63
Nasals .....	61	60.6 . 57.3	56.7 . 57.8

The postorbital region is not only high in *amboinensis*, but it is elongate as well. Dividing, after Nathusius's method, the upper surface of the cranium proper in two parts, by means of an auxiliary frontal line connecting the postorbital processes across the forehead, we find the following proportions in the lengths of the two parts:—

	M.	A.
Percentage from root of the nose to frontal line. . . .	24.3	22.4 . 23.7
Percentage from frontal line to occipital margin . .	32	39.2 . 41

This is one of the characters in which *mindanensis* approaches more closely *S. verrucosus* from Java, and still more the *Sus verruc. ceramicus* from Ceram (see below); whereas in the following it is, as we have seen, at the one extreme, *verrucosus*, with its very short snout, at the other, whilst *amboinensis* holds the middle:—

\* *L. c.* p. 270. In the same place measurements are given of the lachrymal of an immature skull of "*Sus vittatus*," Brit. Mus. 1362 *f*, which in reality is a young *S. verrucosus*; and so is the skull 1362 *g* enumerated in the Catalogue (Cat. Carniv., Pachyd. &c. p. 332; Hand-list Edent. Mamm. p. 58) as *S. vittatus*; "*Sus timoriensis*," 1501 *c*, from Macassar (Cat. Carniv., Pachyd. &c. p. 335; Hand-list Edent. Mamm. p. 60) is the skull of a young of *S. verrucosus celebensis*.

† Pl. xxiv. fig. 3.

‡ The *celebensis* of North Celebes, however, differs less from *philippensis*, according to Nehring ('Ueber *Sus celebensis* und Verwandte,' p. 15).

	M.	A.	C.
Percentage length of molar region of palate (see Nathusius) . . . . .	46.3	49.4 . 50.2	52.4
Percentage length of incisor region of palate (see Nathusius) . . . . .	26.8	24.3 . 22.9	20.9

The crest above the canines in *amboinensis* has a somewhat different shape from what obtains in *philippensis* and *mindanensis*, and agrees with *celebensis*; it is higher than in the first two and considerably thickened behind.

The zygomatic arches bend out more suddenly in *amboinensis* than in *mindanensis* or *philippensis*, which last two in this respect again more approach *verrucosus* from Java, whilst *amboinensis* ranges with *celebensis* and with the Bornean form of *verrucosus*.

Again, as compared with *mindanensis* and *philippensis*, in *amboinensis* (and *celebensis*) the whole of the mandibula is higher and broader, and the ascending ramus longer antero-posteriorly and more vertical; the greater height contributes towards increasing the height of the whole skull when resting on the mandibula in its natural position. In this respect, however, there appears to occur variations in the skull of the *philippensis* from Luzon \*, as also in the height of the skull, independently from that of the mandibula (percent. height of occiput in the two skulls described by Nehring 45.6 . 40.5).

The molars of *amboinensis*, as compared with those of *mindanensis*, are not so narrow, their enamel less delicately wrinkled, and they are less regularly inserted; whilst in *mindanensis* their outer margins lie in a line almost parallel to the long axis of the skull, they form in *amboinensis* a convex line outwardly. As compared with *celebensis*, the third molars of *amboinensis*, though short, are slightly more complicated.

There are to be noticed some small variations between the two skulls from Amboina. The skull 1362 *d*, which, to judge from the wear of the teeth, was a somewhat younger specimen than 1362 *c*, shows the upper contour slightly more concave in the region of the naso-frontal suture. In the same skull this region, viewed from above, is, together with the anterior frontal and the whole nasal region, more flattened and broadened than in 1362 *c*; behind and above the supra-orbital foramina the frontal region of the former skull (1362 *d*) ascends steeper towards the occiput and is more convex from side to side and from before backwards. Both skulls show feebly raised rugosities on their outer nasal

\* See "*S. frenatus*," Heude, *l. c.* tome ii. 1894, p. 216, pl. xxvii. fig. 5.

margins ; in 1362 *c* they are about 7·5 millim. wide and 34·5 millim. long, and terminate near the back end of the nasals, so that they are not situated directly opposite the crests above the canines, but with two thirds of their length backwards from those crests. In 1362 *d* these crests are less distinct. Nehring has pointed out the same conformation in a skull of *celebensis*, and rightly remarks that they call to mind what occurs in *Potamochoerus*\*. The "wart" supported by the crest and the nasal rugosities of *verrucosus* is, of course, the exact homologue of the similar but much stronger developed horn-like cartilage in the males of *Potamochoerus*, and I expect that, as in the latter genus, it will be found to be missing in females and young individuals of the *verrucosus* group.

In the foregoing description of the Amboina pig I had continually to point out its close resemblance to *celebensis*. This is clearly shown as well by the comparative dimensions. In the table of measurements will be found the average percentage measurements of six skulls of male *celebensis*, calculated from the absolute dimensions given by Nehring †. By comparing these with the percentage dimensions of *amboinensis*, it will be seen that there prevails a close agreement in almost all the figures. In absolute size the Amboina skulls agree with the largest of *celebensis*, the basal length varying in the six skulls of C. (see Nehring) from 234–267 millim., as against 268 and 270 millim. in the two skulls of A.

The following few divergences between C. and A. may here be pointed out, the more so as the measurements upon which they rest have, for sake of space, been omitted in the table of measurements.

The canines of *amboinensis* appear to be a little larger; the longest diameter in the alveoli of the upper canines in C. varying from 17–21 millim. (percent. 7·3–8), in A. from 26·5–29 millim. (percent. 10–10·7). The lachrymals, too, are shorter in *celebensis* :—

	A.	C.
Percentage dimensions of lower margin of lachrymal .....	8·9– 9·3	5·6– 7·1
Percentage dimensions of upper margin of lachrymal .....	15·5	11·9–12·8

Contrary to the opinion expressed by myself, Lydekker has endeavoured to show that in the form of the cranium *Sus vittatus* comes nearest, amongst living forms, to the

\* 'Ueber *Sus celebensis* und Verwandte,' p. 10.

† *L. c.* p. 30.

Siwalik *Sus giganteus*, Falc. & Cautl. At the same time he upholds the separation of the Indian *S. cristatus* from the "Javan etc." *S. vittatus*\*. Mr. Lydekker has, I apprehend, been completely misled by the confusion above alluded to in the naming of the skulls. For the form of the cranium of *S. vittatus* he refers † to fig. 3, pl. xxiv. of the 'Hand-list,' "*Aulacochærus vittatus*," so that, as a matter of fact, it is *S. verrucosus amboinensis* which he is comparing with *S. giganteus*. Again, when giving his reasons for the assumed specific distinctness of *S. vittatus* from *S. cristatus*, against the view propounded by Rüttimeyer and myself, he assigns to *S. vittatus* characters which in reality are those of members of the *verrucosus* group:—"In *S. vittatus* m. 3 is normally shorter than in *S. cristatus*; its length, especially in the lower jaw, in all typical examples that have come under the writer's notice being less than that of m. 1, m. 2. . . ." ‡. In a footnote it is stated that "No. 1362 B, British Museum, is an exception, but this specimen not improbably belongs to *S. verrucosus*" ‡. Of the four skulls enumerated in the 'Hand-list' under the heading of "*Aulacochærus vittatus*" (*Sus vittatus*) §, one (1362 *f*) is an immature *Sus verrucosus*, two others (1362 *c* & *d*) are the above-described *S. verrucosus amboinensis*, and a fourth (1362 *g*), *sine patria*, corresponds almost in every particular with *S. verrucosus celebensis*, but has the third molars a little more complex. The skull 1362 B, mentioned by Lydekker, was brought from Java by A. R. Wallace ||, but, far from having anything to do with *S. verrucosus*, it is precisely one of the few skulls labelled *S. vittatus* which is *not S. verrucosus*.

The comparisons instituted by Mr. Lydekker, therefore, strengthen my opinion that it is with the *verrucosus* group, more especially with *amboinensis* and *celebensis*, and not with *S. vittatus*, that *S. giganteus* presents the closer relation. Without entering here more fully into the argument, it may be pointed out that, if we do not limit our comparisons to the Amboina skull, 1362 *c*, alone, the analogy appears still closer. In the second skull from Amboina, 1362 *d*, and in several skulls from Celebes, the occipital height is quite as considerable as in the fossil. Again, the Amboina

\* R. Lydekker, "Siwalik and Narbada Bunodont Suina" [Mem. Geol. Surv. India. ser. x. vol. iii. pt. 2, Calcutta, 1884, pp. 50, 54, 58, 59 (16, 20, 24, 25)].

† L. c. p. 58 (24), footnote.

‡ L. c. p. 50 (16), and footnote 5.

§ P. 58.

|| Catal. Bones Mamm. p. 277; Catal. Carniv., Pachyd. &c. Mamm. p. 332.

skull 1362 *d*, *celebensis* generally, and the Bornean form of *verrucosus*\* have still more prominent zygomatic arches than the skull from Amboina with which Lydekker compared the fossil.

3. *Sus verrucosus ceramicus*, Gray.

A skull of an adult male (B. M. 712 *d*) from Ceram, collected by A. R. Wallace. As mentioned above, Gray originally † considered this skull—rightly, in my opinion—to be a variety of *S. verrucosus*; in the ‘Hand-list’ it figures with the *Sus verrucosus* of Java as “*Dasychærus verrucosus*” ‡.

On account of the slenderness of the snout, this skull presents a very elegant appearance. In length it is equal to weaker specimens of the Javan form; in relative breadth of the zygomatic arches (see table of measurements no. 5) it is the narrowest of all the forms of *verrucosus* which have come under my notice; in relative breadth of the front (nos. 6, 7) it ranges with the narrowest specimens of *S. verrucosus*. In relative height (nos. 15, 16) this skull is surpassed by all the members of the group with the exception of *mindanensis*. The nasal region is very narrow as compared with all the other skulls of the *verrucosus* type. The crest above the canine is weak—short, low, and narrow.

Of the last molar of this specimen Rolleston has stated § that it is comparatively simple as compared with other specimens of *S. verrucosus*. This remark holds good with regard to all the molars and premolars of *ceramicus*; thus it approaches *celebensis* and *amboinensis*; in the elongation of m. 3 it, however, ranges with *verrucosus* from Java.

In a paper by Jentink || mention is made of a *Sus ceramicus*, Rosenberg (Malayisch. Archipel. 1878, p. 362), said to occur in enormous quantities in Ceram and on all the islands from Ceram-laut to Tjjoor. Besides, there are in the Leyden Museum skins from Tidore, Ternate, and Waaigeou, collected by Dr. Bernstein; and Jentink is of opinion that all these are one and the same species, and identical with *Sus niger*, Finsch ¶, from New Guinea.

\* 1362 *a*, not 1362 *b*; see below *S. verrucosus borneensis*.

† P. Z. S. 1868, p. 24, and Cat. Carniv. &c. 1869, p. 330.

‡ Hand-list &c. 1873, p. 59.

§ Trans. Linn. Soc. 1877, (2) i. p. 271.

|| F. A. Jentink, “On the Malayan and Papuan Pigs in the Leyden Museum,” Notes from the Leyden Museum, vol. xiii. Note vi. (Leyden, 1891) pp. 85–104.

¶ P. Z. S. 1886, p. 217.



Jentink, moreover, suggests that Gray's *S. verrucosus*, var. *ceramica*, described above, may prove to be the same as Rosenberg's *S. ceramensis* and Finsch's *S. niger*. This may be; however, so long as the only information we have to rely on is to the effect that these various pigs are of a "uniform black" colour, it is useless to waste time in conjectures. From what Rolleston says\* respecting a skull of a pig from Ternate, which is identical in age and conformation with one in the British Museum ("*Sus timorensis*," 1501 b) †, one thing is certain, viz., that in the island of Ternate exists a wild pig of the *vittatus* type which has nothing to do with *verrucosus*.

#### 4. *Sus verrucosus borneensis*, subsp. n.

The skull of an old male in the British Museum (59.8.16.5—1362 a) ‡ from Borneo, collected by Mr. A. R. Wallace, is, to my knowledge, the only known specimen of a *verrucosus* from Borneo. It is the very opposite of *ceramicus*, being a massive cranium, short and broad, in this character approaching *celebensis* and *amboinensis*, by both of which, however, it is surpassed in height and in the greater elongation of the incisor region (see dimensions below). The crests above the upper canines are of moderate size, as in *S. verrucosus* from Java.

#### 5. *Sus barbatus balabacensis*, subsp. n.

In 1888 Huet described and figured a new species of *Sus* (*S. ahcenobarbus*) from Palawan Island, between Borneo and Mindoro (Philippines), pointing out the supposed differences of the skull from *S. barbatus* of Borneo §. In the following year, Nehring, without being aware of Huet's paper, gave measurements and a provisional description of the skull and

\* *L. c.* p. 276. Rolleston, after describing the skull, adds:—"The colouring, however, of the head of this *Sus* differs from that of any other *Sus* seen by Dr. A. B. Meyer,—or figured by Schlegel—the head being covered all over with long black hair, except in the region occupied by a broad yellowish-brown streak beginning between the eyes and descending to the snout, where it broadens."

† Gray, *Catalogue Carniv. &c.* 1869, p. 335: "*S. timorensis*, 1501 b, . . . a wild pig, Ternate, from Mr. Wallace's collection."

‡ 'Catalogue of Bones,' 1862, p. 277, under the head of *Sus vittatus* (a); *Catal. Carniv. &c.* 1869, p. 330, under *Sus verrucosus*; *Hand-list &c.*, 1873, p. 59, under *Dasycharus verrucosus*, where, by a misprint, it bears the number 136 a.

§ 'Le Naturaliste,' Jan. 1888, p. 5.

a skin of a wild hog from the same island, naming it "*Sus barbatus*, var. *palavensis*, Nehr."\*

Heude has since † made known the skull and teeth of his *Sus calamianensis* from the Calamianes Isles, situated between Mindoro and Palawan, the name having already been published in 1888 in the explanation of a plate showing the upper and lower premolars. Heude refers his species with a query to "*S. longirostris*, Nehr.," and states that "*S. ahænobarbus*, Huet," belongs to the same group.

In the same year Nehring ‡ corrects some errors in the description, measurements, and figures of "*S. ahænobarbus*" (the skull named *S. ahænobarbus* is that of *S. Marchei*, Huet, and *vice versâ*), which he is inclined to consider as identical with his own *S. barbatus* var. *palavensis*.

In the same place § short mention is made of the skull of an adult male from Culion (Calamianes group), and the opinion is expressed that *S. calamianensis*, Heude, is a second variety of *S. barbatus*, "*S. barbatus* var. *calamianensis*, Nehring." A detailed description is promised.

The Natural History Museum received some years ago from Mr. A. H. Everett four skulls of a wild pig from Balabac Island (between Borneo and Palawan), one (B.M. 94.6.8.8) being from a male and three of females (B.M. 94.6.8.7—94.6.8.9—94.6.8.10). The male is almost completely adult, the two anterior thirds of the last molar being in use. Of the female skulls, one (10) is immature, the last molar being almost unworn; skull 9 is of an old and 7 of a very old sow (molars worn to the sockets).

I am of Nehring's opinion, that the pigs from Calamianes and Palawan are somewhat dwarfy varieties of the Bornean *Sus barbatus*, and the same holds good with regard to the Balabac pig. In the table of cranial measurements given below the reduced measurements of *S. barbatus balabacensis* are placed side by side with the same of *S. barb. palavensis*; these last are calculated from the absolute measurements given by Nehring ||; for comparison have been added the measurements of a male and female skull of *S. barbatus*, reduced as above from the tables in Nehring's paper ¶.

\* A. Nehring, "Ueber *Sus celebensis* und Verwandte," *l. c.* pp. 22, 32; *id.* Sitzungsber. naturf. Fr. Berlin, 1890, p. 11.

† "Etude sur les Suilliens," *l. c.* t. ii. 1888, pl. xvii. fig. 4; 1892, pl. xx. B. fig. 3, pl. xxix. C. fig. 7; 1894, p. 221, pl. xl. figs. 1, 2, 5.

‡ Sitzungsber. naturf. Freunde Berlin, 1894, pp. 190, 220.

§ *L. c.* p. 191. See also Nehring, "Ueber die javanischen Wildschwein-Arten," &c. (Zoolog. Garten, xxxvi. 1895, p. 46).

|| "Ueber *Sus celebensis* und Verwandte," p. 32; Sitzungsber. Ges. naturf. Fr. 1894, p. 221.

¶ "Ueber *Sus celebensis*," p. 32.

S. verrucosus <i>mindanensis</i> , Maj. B.M. 91.11.28.3. ♂.	S. verrucosus <i>amboinensis</i> , Maj. B.M. 59.6.4.6. (1932 c.) ♂.	S. verrucosus <i>amboinensis</i> , Maj. B.M. 59.6.4.5. (1932 d.) ♂.	S. verrucosus <i>ceramensis</i> , Gray. B.M. 702 d. ♂.	S. verrucosus <i>borneensis</i> , Maj. B.M. 59.8.16.5. (1932 a.) ♂.	<i>S. barbatus balabacensis</i> , Maj.				
					B.M. 94.6.8.8. ♂.	B.M. 94.6.8.9. ♀.	B.M. 94.6.8.7. ♀.	B.M. 94.6.8.10. ♀ jun.	
Skull measurements.									
1. Basal length of cranium . . . . .	269	270	268	325	313	288	307	265	
2. Profile length (from occip. crest to ant. end of intermax.) . . . . .	319	330	334	388	360	346	353	301	
3. Length from foram. magn. to post. end of vomer . . . . .	43	46	44	53	43.5	38	42	39	
4. Length from foram. magn. to back of palate (middle line) . . . . .	75	72	74	80	68	62	68.5	62	
4 a. Length from back of palate to ant. end of intermax. . . . .	194	198.5	194	241	245	226	238.5	205	
4 b. Length of molar region of palate . . . . .	124.5	133.5	134.5	171	177.5	166	170.5	146	
4 c. Length of incisor region of palate . . . . .	72	65.5	61.5	70	69	61	68.5	59	
30. Length of intermaxilla at alveo- lar margin . . . . .	71	65	61	65	69	63.5	71	59.5	
5. Width of cranium at largest (be- tween zygom. arches) . . . . .	130	142	147	174	125	123.5	134.5	112.5	
6. Frontal breadth between post- orbital processes . . . . .	88	9	98	100	90.5	88	93	83	
7. Frontal breadth at narrowest (between upper lachr. sutures)	59	63	73	74	61.5	60	64.2	53	
9. Breadth at largest between oc- cipital alae . . . . .	71	81	....	87	60	62	66	57.5	

10. Width of nasals between post. ends of internax. ....	25.5	27	29.5	24.5	31	28	28.5	31	25.5
11. Palatal breadth between ant. part of m. 3. ....	23	21	25.5	24	33	22	27	21	21
12. Palatal breadth between ant. part of m. 1. ....	26	27.5	29	28	29	24.5	28.5	29.5	24.5
13. Palatal breadth between ant. part of p. 3. ....	32.5	35	34.5	37.5	ca. 42	30.5	35.5	35.5	28.5
14. Breadth of snout directly above p. 3. ....	46	47	49	53	54	45	47	48.5	40
15. Height of occiput from lower margin of for. magn. ....	107.5	119	121	134	135	104	98	103.5	90
16. Height of skull when resting on mandibula. ....	170	205	216	209	220	180	177	182	170
18. Length of nasals (middle line) ..	164	153	155	195	....	166	155	....	139
18 b. Length of palatine bone behind m. 3 (middle line) ..	4.5	11.5	16.5	18.5	25.5	32	29	29	17.5
18 c. From nasals to middle of a line drawn between postorb. procc. ....	65.5	60.5	63.5	82	....	95	90	....	80.5
18 d. From same "frontal line" to middle of occipital crest. ....	86	106	110	109	103.5	92	95.5	91	80
24. Joint length of upper molars and premolars. ....	93.5	96	94	124	108	113	108	112.5	107
27. Length of upper m. 3. ....	24	26	25	36	32	29	27	30	25.5
32. Length of horizontal mandibular ramus from post. end of m. 3. ....	165	162	159	204	191.5	190	175	185	167
33. Breadth of mandibula at largest (between condyles) ..	110	123	....	....	139	104.5	104.5	109.5	94
36. Length of lower m. 3. ....	20.5	27	27	39.5	37	33	31.5	37.5	30

Cranial percentages.	<i>S. verrucosus mindanensis</i> , Maj. B.M. 91.11.23.3. ♂.		<i>S. verrucosus philippensis</i> , Nelr. Z. M. Dresden 1138. ♂. L. H. Berlin, 4412. Nehrng. ♂.		<i>S. verrucosus amboinensis</i> , Maj. B.M. 59.6.4.5. 1362 z. ♂. B.M. 59.6.4.6. 1362 z. ♂.		<i>S. verrucosus celobensis</i> . Av. of 6 skulls. ♂.		<i>S. verrucosus ceranicus</i> , Gray. B.M. 702 d. ♂.		<i>S. verrucosus borneensis</i> , Maj. B.M. 59.3.16.5. ♂.		<i>S. verrucosus</i> . Java. Av. of 4 skulls.	
1. Basal length of cranium .....	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2. Profile length of cranium .....	118.5	121.6	117.8	117.8	122.2	124.6	120.8	120.8	120	120.7	122.3	122.3	122.3	122.3
3. Length from for. magn. to post. end of vomer .....	16	16.6	15.87	15.87	17	16.4	17	17	17.9	16.5	17.3	17.3	17.3	17.3
4. Length from for. magn. to back of palate (middle line) .....	28	27	27	27	26.7	27.6	26.82	26.82	26.2	24.9	26.17	26.17	26.17	26.17
4 a. Length from back of palat. to ant. end of intermax. ....	72.1	.....	.....	.....	73.5	72.4	.....	.....	73.3	75.3	.....	.....	.....	.....
4 b. Length of molar region of palate ..	46.3	.....	.....	.....	49.4	50.2	.....	.....	52.4	53.2	.....	.....	.....	.....
4 c. Length of incisor region of palate ..	26.8	.....	.....	.....	24.3	22.9	.....	.....	20.9	21.8	.....	.....	.....	.....
30. Length of intermaxilla at alveolar margin .....	26.4	24.7	23.8	23.8	24.1	22.8	23.53	23.53	20.6	20.2	21.54	21.54	21.54	21.54
5. Width of cranium at largest (between zygom. arches) .....	48.3	52.5	51.2	51.2	52.6	54.8	53.77	53.77	46.4	54.1	49.77	49.77	49.77	49.77
6. Frontal breadth between postorbital processes .....	32.7	34.7	33.7	33.7	33.7	36.6	35.31	35.31	28.2	31.1	29.75	29.75	29.75	29.75
7. Frontal breadth at narrowest (between upper lachr. suture) .....	22	23.16	22.2	22.2	23.33	27.2	24.03	24.03	20	23	21.25	21.25	21.25	21.25
9. Breadth at largest between occipital ale .....	26.4	33.2	29.4	29.4	30	.....	31.03	31.03	.....	27.1	26.93	26.93	26.93	26.93



10. Width of nasals between post. ends of intermax. ....	9.5	10	9.13	10	11	10.92	7.4	9.6	8.37
11. Palatal width between ant. part of m. 3. ....	8.5	7.9	7.3	7.8	9.5	9.06	7.3	10.3	8.45
12. Palatal width between ant. part of m. 1. ....	9.7	10	8.3	10.2	10.8	10.6	8.5	9	9.42
13. Palatal width between ant. part of p. 3. ....	12.1	12	11.1	13	12.9	12.73	11.4	ca. 13.1	11.9
14. Breadth of snout directly above p. 3. ....	17.1	16.4	15.9	17.4	18.3	17.25	16.1	16.8	16.75
15. Height of occiput from lower margin of for. magn. ....	40	45.6	40.5	44.1	45.15	44.8	40.6	42	41.37
16. Height of skull when resting on mandibula. ....	63.2	73.36	68.65	75.9	80.6	76.09	63.3	68.4	66.3
18. Length of nasals (middle line) ....	61	60.6	57.1	56.7	57.8	57.65	59.1	....	57.77
18 <i>b</i> . Length of palatine bone behind m. 3 (middle line) ....	1.7	....	....	4.3	6.2	....	5.6	8	....
18 <i>c</i> . From nasals to middle of a line drawn between postorb. processes	24.3	....	....	22.4	23.7	....	24.8	....	....
18 <i>d</i> . From same "frontal line" to middle of occipital crest. ....	32	....	....	39.2	41	....	33	32.2	....
24. Joint length of upper molars and premolars. ....	34.8	34.36	36.5	35.55	35.1	34.85	37.6	33.6	35.5
27. Length of upper m. 3. ....	8.9	8.5	9.1	9.6	9.3	8.9	10.9	9.95	10.56
32. Length of horizontal mandibular ramus. ....	61.3	57.9	57.9	60	59.3	58.07	61.8	....	60.17
33. Breadth of mandibula at largest (between condyles) ....	40.8	44	42.5	45.55	....	44.97	....	43.2	41.5
36. Length of lower m. 3. ....	9.8	10	9.5	10	10	10.05	12	11.5	12.16

Cranial percentages.	<i>Sus barbatus balabacensis</i> , Maj.				<i>S. barbatus palavensis</i> , Nehr. 4472. ♀.	<i>S. barbatus palavensis</i> , Nehr. Palawan (Paragua). ♂.	<i>S. barbatus palavensis</i> , Nehr. (S. uhlenob., Huet). ♂.	<i>S. barbatus</i> . Berlin, 4066. Nehring. ♂.	<i>S. barbatus</i> . Dresden, 478. Nehring. ♀.
	B.M. 94.6.8.8. ♂.	B.M. 94.6.8.9. ♀.	B.M. 94.6.8.7. ♀.	B.M. 94.6.8.10. ♀ jun.					
1. Basal length of cranium .....	100	100	100	100	100	100	100	100	
2. Profile length of cranium .....	115	120.1	115	113.6	115	113.8	123.1	113.2	
3. Length from for. magn. to post. end of vomer .....	13.9	13.2	13.7	14.7	14.4	....	12.7	13.2	
4. Length from for. magn. to back of palate (middle line) .....	21.7	21.5	22.3	23.4	22.45	....	21.1	21.1	
4 a. Length from back of palate to ant. end of intermax. ....	78.3	78.5	77.7	77.4	....	....	....	....	
4 b. Length of molar region of palate ..	56.7	57.6	55.5	55.1	....	....	....	....	
4 c. Length of incisor region of palate...	22	21.2	22.3	22.3	....	....	....	....	
30. Length of intermaxilla at alveolar margin .....	22	22	23.1	22.45	20.35	....	20.4	21.9	
5. Width of cranium at largest (between zygom. arches) .....	39.97	42.9	43.8	42.45	42.45	47.5	40.9	42.7	
6. Frontal breadth between postorbital processes .....	23.9	30.55	30.3	31.3	30.2	....	27.1	28.6	
7. Frontal breadth at narrowest (between upper lachr. suture) .....	19.65	20.8	20.2	20	20.7	....	18.55	19.1	
9. Breadth at largest between occipital ale .....	19.2	21.5	21.5	21.7	21.4	20	17.33	18.8	

10. Width of nasals between post. ends of intermax. ....	8.9	9.9	10.1	9.6	10.2	....	....	9.55	9.55
11. Palatal width between ant. part of m. 3. ....	37	9.4	6.8	7.9	7.7	....	....	6.8	7.2
12. Palatal width between ant. part of m. 1. ....	7.8	9.9	9.6	9.2	7	....	....	8	8.8
13. Palatal width between ant. part of p. 3. ....	9.7	12.3	11.6	10.75	9.5	....	....	10.4	10.1
14. Breadth of snout directly above p. 3. ....	14.4	16.3	15.8	15.1	15.1	....	....	14	15.45
15. Height of occiput from lower margin of for. magn. ....	33.2	34	33.7	33.96	33.7	....	....	36	32.86
16. Height of skull when resting on mandibula. ....	56.6	61.4	59.3	55.6	64.6	....	....	53.8	62.9
18. Length of nasals (middle line) ....	53	53.8	....	52.45	52.6	....	....	60.4	52
18 b. Length of palatine bone behind m. 3 (middle line) ....	10.2	10.1	9.4	6.6	10.2	12.5	....	14.9	15.17
18 c. From nasals to middle of a line drawn between postorb. processes. ....	30.35	31.25	....	30.4	....	....	....	....	....
18 d. From same "frontal line" to middle of occipital crest. ....	29.4	33.15	29.6	30.2	....	....	....	....	....
24. Joint length of upper molars and pre-molars. ....	36.1	37.5	36.6	40.4	36.8	34.1	36.89	30.2	33.4
27. Length of upper m. 3. ....	9.3	9.4	9.8	9.6	9.8	....	....	8.4	9.27
32. Length of horizontal mandibular ramus. ....	60.7	60.8	60.3	63	57.6	....	....	57.8	56.74
33. Breadth of mandibula at largest (between condyles) ....	3.4	36.3	35.7	35.5	36.8	....	....	33.8	....
36. Length of lower m. 3. ....	10.5	10.9	12.2	11.3	10.2	....	....	10	11.79

I do not propose to enter here into a detailed description of the differences between the *barbatus* and the *verrucosus* group. It may suffice to point out the greater length in *barbatus* of that part of the upper surface of the cranium situated behind a line connecting the postorbital processes (no. 18 *d* of table of measurements), as well as the superior length, compared with *verrucosus*, of the bony palate of *barbatus* (nos. 4 *a*, 18 *b*), whereas the length between the foramen magnum and posterior end of the vomer is shortened in proportion\*. Some variation in this respect occurs in the *verrucosus* group (see measurements). Another point of difference between the two groups, which strikes at once, is the height of the skull (no. 15), even those members of the *verrucosus* group which possess the lowest skull (*mindanensis*—*ceramicus*) remaining considerably above those of the *barbatus* group.

The *barbatus* skull, besides being very elongate—the intermaxilla, however, is relatively short—is also narrow, as compared with *verrucosus* (see nos. 6, 7, 9, 14, 33). As to the width of the cranium, between the zygomatic arches, there occurs a considerable amount of variation in the various members of the *barbatus* group. The female skulls alone would not have justified the separation of the Balabac form from that of Palawan; but in the breadth of the male skulls a considerable difference is to be noticed. The adult male of Palawan †, though having a shorter skull than the male from Balabac—P.=305, B.=313—has a breadth of 145 millim. against 125 as shown by B.; the immature type of "*S. ahanobarbus*" already surpasses B. in this respect.

*S. barb. calamianensis* also has a much broader skull than the Balabac form; length of skull from Cunion 315, breadth 147 millim. ‡; the same appears from the figure given by Heude §.

Tables are given (pp. 536-541) of measurements to which reference has already been made in the text. The measurements are mostly those used by Nathusius ('Vorstudien') and by Rüttimeyer (*l. c.*), with some alterations proposed by Nehring ('Ueber *Sus celebensis* und Verwandte'), to whose tables most of the numbers prefixed refer.

\* See Nehring's various papers on "*S. longirostris*," Zool. Anz. 1885, Sitzungsber. Ges. naturf. Fr. 1886, p. 80, as well as "Ueber *Sus celebensis* und Verwandte," *l. c.* pp. 18-20; Heude, *l. c.* ii. 1894, p. 221, pl. xl. fig. 5; Nehring, Zool. Garten, xxxvi. 1895, p. 46 and fig. 1.

† Nehring, Sitzungsber. Ges. naturf. Fr. 1894, p. 221.

‡ Nehring, *ibid.* 1894, p. 192.

§ *L. c.* pl. xl. fig. 1.